The Marriage-flight of a Bull-dog Ant
(*Myrmecia sanguinea* F. Smith)

By WILLIAM MORTON WHEELER

Reprinted from THE JOURNAL OF ANIMAL BEHAVIOR
January-February, 1916, vol. 6, no. 1, pp. 70-73

THE MARRIAGE-FLIGHT OF A BULL-DOG ANT (*MYRMECIA SANGUINEA* F. SMITH)

WILLIAM MORTON WHEELER

During a recent visit to Australia I had an opportunity to study in the field the habits of a number of species of the large ants popularly known as "bull-dog ants," belonging to the very primitive genus *Myrmecia*. This genus comprises some sixty described species, subspecies and varieties, all confined to Australia and the island of New Caledonia. They bear about the same relation to the more specialized and more modern ants that the Marsupials of Australia bear to the placental mammals of other continents. Many of the species are among the largest of ants, several of them are beautifully colored and sculptured, and all of them sting or both sting and bite severely. In his latest work on the Ponerinae in the "Genera Insectorum" Emery divides the genus *Myrmecia* into three subgenera, *Myrmecia* sens. str., *Pristomyrmecia* and *Promyrmecia*. I have found that the species of these three groups differ greatly in nesting and other habits. A detailed account of my observations will be published later in connection with taxonomic descriptions of the various forms. Here my remarks will be mainly confined to one of the largest and most aggressive species, *Myrmecia sanguinea* F. Smith, an ant which must be widely distributed in Australia, since it has been recorded from Queensland, New South Wales, South and Western Australia and Tasmania. I found it very abundant at Salisbury Court, near Uralla in northern New South Wales, where, through the courtesy of the government entomologist, Mr. W. W. Froggatt, I was able to spend a few days at a laboratory recently established for the study of the blow-flies that have acquired the unfortunate habit of injuring living sheep.

In the open forest surrounding the laboratory there are many large nests of *sanguinea*, mounds of earth of a more or less conical shape, varying from three to five feet in diameter at the base and one to two feet in height. The surfaces of these

mounds are covered with a thin layer of bits of charred wood, dead leaves, twigs and pebbles collected by the ants. The entrance to the nest is a rather small hole, scarcely more than half or three quarters of an inch in diameter and usually situated on one of the slopes near but not at the summit.

Each nest contains about 200 to 500 workers. These are subopaque, rich brownish red in color, with the gaster shining black, and vary considerably in size, from 12 to 28 mm. The females measure 26 to 28 mm., the males 18 to 20 mm. The smallest workers, not exceeding 12 to 15 mm. in length, function as door-keepers and are usually found stationed just within the nest-entrance, with their long, scissor-like mandibles directed outward. When the nest is disturbed these small workers are the first to sally forth, followed by others of the same or medium size, and it is only somewhat later that the huge and formidable individuals, measuring 25 to 28 mm. advance to the attack with wide open jaws and threatening sting. This behavior is the reverse of that observed in other ants (e. g. in species of *Camponotus*, *Colobopsis*, *Atta*, *Pheidole*, etc.), the major workers or soldiers of which act as door-keepers and are among the first to rush to the defence of the colony. Unlike the puny, small-eyed ants of our northern latitudes, the bull-dogs can clearly discern objects at a distance of several feet with their great, prominent, abundantly facetted eyes. They lose no time in running about in all directions hunting for the intruder, but with ferocious unanimity make directly for him. The extraordinary tenacity with which they hold on with their mandibles to any moving object that comes in their path is, of course, responsible for their popular name, but no one has been able to suggest a polite epithet that will do justice to the virulence of their sting.

At the time of my visit to Salisbury Court, during the last week of November, there were no winged males or females in the nests, though there were plenty of larvae and a small number of worker pupae. This is rather surprising because the sexual forms of most of the ants of New South Wales are to be found in the nests during late October and early November. Mr. Froggatt expressed the opinion that the males and females of the various species of *Myrmecia* do not mature till January. This opinion has been confirmed in a letter recently received, in which he describes a remarkable marriage flight of *sanguinea*

in a locality very near the one in which I studied the nests. Fully to appreciate his description, the reader must bear in mind what I have said about the size of the females of this ant. They, of course, have powerful stings, like the workers, though the males are stingless and have feeble mandibles. Mr. Froggatt's account runs as follows:

"On January 30th, after some very hot, stormy weather, while I was at Chevy Chase, near Armidale, N. S. W., I crossed the paddock and climbed to the top of Mt. Roul, an isolated, flat-topped, basaltic hill, which rises about 300 feet above the surrounding open, cleared country. The summit, about half an acre in extent, is covered with low "black-thorn" bushes (*Busaria spinifera*). I saw no signs of bull-dog ant nests till I reached the summit. Then I was enveloped in a regular cloud of the great winged ants. They were out in thousands and thousands, resting on the rocks and grass. The air was full of them, but they were chiefly flying in great numbers about the bushes where the males were copulating with the females. As soon as a male (and there were apparently hundreds of males to every female) captured a female on a bush, other males surrounded the couple till there was a struggling mass of ants forming a ball as big as one's fist. Then something seemed to give way, the ball would fall to the ground and the ants would scatter. As many as half a dozen of these balls would keep forming on every little bush and this went on throughout the morning. I was a bit frightened at first but the ants took no notice of me, as the males were all so eager in their endeavors to seize the females."

Except for the great size of the participants, this nuptial flight presents an exact picture of occasional flights of some of our common Myrmicine ants, especially of *Myrmica scabrinodis* Nyl. That such enormous swarms of *Myrmecia* as the one described must be of rare occurrence, is evident from the statement of such a keen observer as Mr. Froggatt that he has "never before seen more than a dozen winged bull-dog ants of any species together." I find, however, a brief description by Tepper[1] of what must have been a very similar scene. He describes a nuptial flight of one of the large species of *Myrmecia*

[1] Observations about the Habits of Some South Australian Ants. *Trans. & Proc. Roy. Soc. S. Austr.*, 5, 1882, pp. 24-26, 106-107.

(probably *sanguinea* or *pyriformis*), early in April in South Australia, as "rather a formidable affair, owing to many hundreds of the large creatures (the female above an inch in length while alive) flitting about one's head, all armed with a sting about a quarter of an inch in length, while the shrubs near the nest were covered with scores of pairs and single ones."

The observations of Tepper and Froggatt prove conclusively that the species of the Ponerine genus *Myrmecia* celebrate a regular marriage flight like all the ants of the other taxonomic subfamilies, except the species with wingless males or females, and that these flights occur during January in northern New South Wales or a few months later in the more southern and colder portions of Australia. This season corresponds, of course, to our autumn months, which are likewise the nuptial season of some of our species of *Lasius* (*L. claviger* Roger, *brevicornis* Emery, etc.) We may also infer from the accounts of the two Australian observers that each female *Myrmecia*, after fecundation, loses her wings in the same manner as other ants, except certain parasitic species, enters the ground and establishes a small colony without the assistance of workers of her own species. I am able to show that this is actually the case. On September 19, 1914, I found under a stone in one of the deep sandstone canyons near Katoomba, in the Blue Mts. of New South Wales, a fine dealated female of *Myrmecia tricolor* Mayr occupying a little cavity in the soil and engaged in caring for about a dozen small larvae. This little incipient colony was very similar to those just established by our common carpenter ants (*Camponotus pennsylvanicus* DeGeer and *noveboracensis* Fitch) under the bark of old logs. That the most primitive of existing ants should found their colonies in precisely the same manner as the most highly specialized species, is not without interest.